

3.2 Systems of Linear Equations

3.2 # 32, 40, 52

Ex.

$$A = \begin{bmatrix} 3 & 1 \\ 1 & 2 \\ 2 & 8 \end{bmatrix} \quad B = \begin{bmatrix} 2 & 1 & 4 \\ 0 & 1 & 2 \end{bmatrix}$$

$$3(2) + 1(0) \quad 3(1) + 1(1) \quad 3(4) + 1(2)$$

$$1(2) + 2(0) \quad 1(1) + 2(1) \quad 1(4) + 2(2)$$

$$2(2) + 8(0) \quad 2(1) + 8(1) \quad 2(4) + 8(2)$$

$$BA = \begin{bmatrix} 6 & 4 & 14 \\ 2 & 3 & 8 \\ 4 & 10 & 24 \end{bmatrix}$$

Differentiating Matrices

$$A = \begin{bmatrix} x^2 \\ \sin x \end{bmatrix}, \quad A' = \begin{bmatrix} 2x \\ \cos x \end{bmatrix}$$

$$(cA)' = cA'$$

$$(A+B)' = A' + B'$$

$$(AB)' = A'B + AB'$$

$$\begin{bmatrix} 1 & 2 \\ 3 & 8 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 10 \\ 7 \end{bmatrix}$$

$$1(x) + 2(y) = 10 \quad -4x - 8y = -40$$

$$3(x) + 8(y) = 7 \quad 3x + 8y = 7$$

$$x + 2y = 10 \quad -x = -33$$

$$3x + 8y = 7 \quad x = 33$$

$$y = -23/2$$

$$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 33 \\ -23/2 \end{bmatrix}$$

calculator

$$2x - 4y + 3z = 10$$

$$-x + y + 10z = 2$$

$$y - 2z = 5$$

$$\begin{bmatrix} -2 & -4 & 3 \\ -1 & 1 & 10 \\ 0 & 1 & -2 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 10 \\ 2 \\ 5 \end{bmatrix}$$

Coefficient Matrix

$$\begin{bmatrix} 2 & -4 & 3 & 10 \\ -1 & 1 & 10 & 2 \\ 0 & 1 & -2 & 5 \end{bmatrix}$$